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ordinary gas-burner uses over six feet of gas per hour: one mechanical horse-power at our oil-engine can supply twelve corresponding incandescent electric lights; or 1.7 pints of oil must be compared with 72 feet of gas; roughly, 24 pints of oil will equal 1,000 feet of gas. The quality of oil used cannot cost as much as ten cents per gallon: at that price the oil for our engine will compare with gas at thirty cents per thousand. To this we must add about fifteen cents for breakage of lamps, making forty-five cents per thousand. The amount to be added for interest and deterioration depends entirely upon the amount of light used: for an ordinary household, using four or five thousand feet of gas a month, this item might amount to a dollar a thousand at a very liberal estimate, making the total cost one dollar and forty-five cents a thousand at the outside, and giving all the advantages that incandescent lighting offers,—greater health, convenience, comfort, and beauty, with the use of small motors for various domestic purposes.

ACCUMULATOR TESTS.—The London *Electrician* contains the following: "Prof. von Waldenhofen has recently carried out at the Electro-Technical Institute a comprehensive series of experiments with the storage-cells of the Fahrbarky and Schenck, Reckenzaun and Julien type. The chief object of the experiments was to ascertain the efficiency of each type, especially for tramway purposes, and to eliminate errors in estimating the degree to which the cells had been charged or discharged. The experimenter based his investigation on three measurements; viz., the electro-motive force on open circuit, the density of the electrolyte, and the potential difference when at work. The efficiency of the Reckenzaun accumulator was found to be 89.3 per cent for quantity, and 80.5 per cent for energy. For the Julien accumulator, the figures were respectively 89.7 per cent and 83.4 per cent; whilst the Schenck-Fahrbarky accumulator gave 91 per cent efficiency for quantity, and 78.5 per cent for energy." These figures are interesting; but as the efficiency of any accumulator varies greatly with the rate of discharge, decreasing as the discharge rate increases, it would be well to give with the efficiencies the rate of discharge at which they were obtained. As the experiments were for tramway-work, however, we may assume that rather heavy currents were used: this being the case, the tests are most encouraging.

THE BENTLY-KNIGHT ELECTRIC TRAMWAY IN ALLEGHENY CITY.—This line is about four miles in length, and employs both overhead conductors and conduits. In both cases there is a complete metallic circuit, neither the rails nor earth being used as a return. The road is difficult, with one grade of 9½ feet in 100 feet for a distance of 400 feet, and numerous others; the average rise in a distance of 4,900 feet being 295 feet,—over six per cent. Two fifteen-horse power motors are used under each car, connected with the axles by spur-gearings. There are at present four cars running, with two more to be added shortly.

HEALTH MATTERS.

State Medicine.

At the meeting of the American Medical Association held in Cincinnati during the present month, Dr. H. P. Walcott, chairman of the State Board of Health of Massachusetts, delivered the annual address on State medicine. For the following abstract of the address we are indebted to the *New York Medical Record*:—

Dr. Walcott first related briefly the history of the State Board of Health of Massachusetts, which was established by legislative action in 1869. Its duties were at first advisory rather than executive; but, in proportion as public intelligence in sanitary matters was quickened, the functions of the board were enlarged, until now it is charged to some extent with the power of enforcing the rights of the people to pure air, soil, water, and food, and preventing and punishing any violation of them. It is also intrusted with the business of gathering information concerning any matter pertaining to public health, and diffusing such information among the people. Among the chief of its duties in this connection is the investigation of the causes and the prevention of infectious diseases. A comparison of the mortality statistics will show in a measure the effect which all this work has had upon the health of the people. The number of deaths from all causes, in proportion to the population,

has changed but little during a period of thirty-six years, ending with 1886; but the percentage of deaths from zymotic diseases has almost steadily decreased, during the period that the State Board has been in existence, from 25.6 to 19.0; there has also been a general tendency, though less marked, in the direction of a decrease of deaths from constitutional diseases. The classification of preventible diseases is as yet not well defined; and year by year, as the experience of sanitarians becomes widened, a larger and larger number of affections are found to be the result of influences that can be removed. This fact is illustrated in the case of consumption, the prevalence of which was shown twenty-five years ago by a former president of this association, Dr. H. G. Bowditch, to be largely influenced by conditions of soil, moisture, and land-drainage. The most marked reduction has occurred in the case of small-pox, which is a disease that is absolutely preventible by means of vaccination and re-vaccination. In demonstration of the saving of life in consequence of better sanitary conditions, the speaker offered a comparison between the results of ovariectomy and those following the labors of an intelligent and efficient board of health. The largest number of deaths in Massachusetts in any one year from ovarian dropsy was 51. In the single city of Somerville the death-rate has been reduced, since the organization of a municipal board of health, from 22.86 to 16.68 per thousand. Thus the adoption of sanitary measures has saved more lives in one year, in a community of thirty thousand people, than could have been restored to health in the same period in a State of nearly two millions of inhabitants, by an operation which is justly regarded as one of the greatest triumphs of American surgery. It has been said by Dr. Russell of Glasgow that nothing is more conspicuous than the helplessness of the individual, under the conditions of civilized life, to secure the physical basis of health. How can any single individual in a crowded city detect and remove all possible causes of disease in the water, food, sewerage, and air contamination? There is no help but in co-operation on the most extended scale possible,—individual, municipal, State, and national. The individual must be compelled to give up the liberty to injure his neighbor; the city must be restrained from converting into a sewer the river which supplies water to the villages that cluster about its banks lower down in its course; no State should permit its own causes of disease, whether they are persons or things, to be transported into another State; lastly, the general government should take cognizance of those causes of disease which can be controlled by no other power. A sufficient safeguard will never be established by voluntary associations on the part of persons, towns, States, or even nations. How, then, shall we organize for the protection of the public health? For the individual, the speaker maintained: "Let the State give him some assurance that the legally used title of physician designates a person sufficiently qualified to give advice for the prevention and cure of disease; establish, by direct provision of State law, local health authorities for each village, town, city, or county; and, to control all these local organizations, let there be a State board, clothed with ample powers." All arguments that have been used for the existence of State health authorities, Dr. Walcott believed, are also available for the creation and support of some central health authority. The question of form of this organization is one that may be left to the law-making powers. A board in which every State was represented might be cumbersome, but it could easily delegate its powers to a small and compact executive committee during the intervals between the necessarily infrequent meetings of the full board. The only alternative to this seemed to the speaker to be a single officer at the head of a bureau in connection with some one of the departments at Washington. This central authority, however constituted, should have ample means for investigating into the State boards of health. There is still in legal existence a national board of health; but, through the neglect of Congress, it is in a state of hopeless lethargy. This board entered upon its work with every promise of success, and it demonstrated that local, State, and national health authorities could profitably and harmoniously unite in suppressing an epidemic of yellow-fever, and preventing its spread from State to State; yet this did not save it from practical extinction. The failure of the board to survive the unjustifiable attack made upon it was due in great measure, the speaker thought, to its organic form, embracing, as it did, members

of the army, navy, and marine-hospital service, and having a totally insufficient State representation.

In conclusion, Dr. Walcott urged the proper organization of some central health authority, whether in the form of a bureau of health or a board of health; provided, only, that some part of the great resources of the nation might be turned to the protection of that greatest of all property, human life. The address was referred, with the thanks of the association, to the Committee on Publication, from the section on State medicine.

Too Many Medical Students.

The president of the American Medical Association, Dr. A. Y. P. Garnett of Washington, took for the subject of his presidential address 'The Mission of the American Medical Association.' Its paternal relation to the entire profession of the United States imposes upon it duties and responsibilities of the gravest character. He said: "Taking a retrospective view through nearly half a century of existence, we have no reason to be discouraged. But, while we feel gratified by contemplation of the fruits of our labor in the past, it is obviously important that we should not be flattered into a belief that we have accomplished our mission, and permit ourselves to lapse into supine indifference with regard to a pre-eminently important object which remains to be worked out through the instrumentality of this association. I refer, gentlemen, to radical and thorough reform in the present system of medical education in the United States." He submitted the following propositions:—

"*Proposition First.* That a standing committee, to be called the Committee on Legislation, shall be appointed for each State and Territory, and the District of Columbia, to consist of five members of the medical profession in good standing, three of whom shall have no official connection with any medical school or college, whose duty it shall be to carry out, as far as possible, the following instructions:

"*a.* Each one of said committee, or a majority thereof, shall attend the sessions of their respective Legislature from time to time, as their duties may require, for the purpose of using all honorable means looking to the reduction of medical schools in the United States, and the consequent diminution of the annual number of graduates; that, as a practical measure to this end, they urge the passage of a law requiring that in the future granting of charters for creating medical schools there shall be a clause in every such charter requiring that all schools or colleges thus created shall demand a full term of four years' study before granting a diploma thereof, and that no student shall be admitted to matriculate who has not passed satisfactory examination, oral and written, in the ordinary branches of academic study; and, further, that any college failing to show a greater number than fifty matriculates annually for three consecutive years shall forfeit its charter and be abolished.

"*b.* That they use all diligent efforts to secure an ordinance creating in each State and Territory where no such board at present exists, and in the District of Columbia, a board of medical examiners, which shall have no connection with any medical school, and which shall be required to examine all applicants for license to practise medicine in the States, Territories, and the District; and that any person who may be detected practising any branch of the healing art without a license granted by the said board shall be subject to such penalties as the law may provide.

"That this committee may be authorized by statute to select and nominate to the governors of the States, Territories, and the District of Columbia, seven competent learned members of the medical profession, to constitute such a board of examiners, who shall have exclusive power to issue licenses to practise the art and science of medicine and surgery.

"*c.* That the chairman of the said committee of five be required to submit at each annual meeting of the association a report embracing a full statement of what has been accomplished by each.

"*Proposition Second.* That the faculties of the several medical schools within the limits of the United States be once more urgently requested to call a convention at some central point for the purpose of consultation and adopting some general and uniform system of medical education, more comprehensive and rigid in its requirements, and more in accord with the spirit of the age and

advanced progress of medical science, suggesting four years' term of study, the requirements of a preliminary education including some knowledge of the classics; that any college or school which shall refuse to enter into such arrangement as may be decided upon by the said convention shall be excluded from all connection with the American Medical Association, and its alumni shall not be recognized as members of the regular profession."

OLEOMARGARINE IN MASSACHUSETTS. — The Legislature of Massachusetts has passed a law prohibiting the sale of oleomargarine in that State. The State Board of Health advised the Legislature against the passage of the bill, holding that oleomargarine was not injurious to health.

THE TYPHOID BACILLUS. — Another epidemic of typhoid-fever has been traced to infected drinking-water, the typhoid bacillus having been discovered in the water. The outbreak occurred in a boarding-school at Quimper, France, one-sixth of all the inmates being attacked, and one in eleven dying.

THE NUMBER OF MEDICAL STUDENTS. — The *British Medical Journal* gives the following as the number of medical students in the following universities in the winter session just elapsed: in Vienna, 2,287; Munich, 1,369; Berlin, 1,316; Würzburg, 956; Leipzig, 794; Prague, 566; Graz, 501; Griefswald, 471; Breslau, 382; Freiburg, 350.

MENTAL SCIENCE.

Reflex Speech.

ACTS performed at first with great effort, by constant repetition become so thoroughly ingrained in the nervous system that they are performed without the slightest effort, or even may be performed in spite of a more or less strong effort to resist them. When this occurs, an originally voluntary act is said to have lapsed into the automatic or reflex stage; the act has become mechanical; and pressing the proper key will produce the appropriate re-action. In a recent issue of the *Journal of Mental Science*, Dr. G. M. Robertson calls attention to the fact that there exists a large number of colloquial phrases that have become automatic. Speech, though at first learned with great difficulty, becomes the most natural channel for expressive movements. We are daily asked, "How are you?" and as frequently reply, "Very well, thank you." And the best proof of how very automatic and unreflective this answer is, is given by the innumerable cases in which this is said even when we are not well. This is present in a perfectly healthy mind, but it remains obscured. When we are excited or confused, or, better still, absent-minded, the phenomenon becomes more prominent. Ask an absent-minded friend, "How are the family to-day?" or "How is your brother Tom?" and he tells you, "They are well, thanks;" and immediately adds, "What *have* I been saying? Why, my father is laid up with gout," or "Tom has broken his arm."

All reflexes are controlled in health, but appear in exaggerated forms in disease. This speech-reflex becomes very marked in dementia, where there is a gradual breakdown of the mental structure, and, as is the universal law, the highest, least stable products are the first to decay. The power of intelligent speech is lost or enormously reduced, but the more deeply acquired habit of automatic responses is retained. One such demented patient showed practically no intelligence: he never even asked for food or drink. He underwent a severe surgical operation without saying a word, but his reflex speech was preserved. Here are samples of it: "How are you?"—"Oh, just about the ordinar', thank ye."—"How are you feeling to-day?"—"Oh, pretty weel, thank ye."—"How's all with you?"—"I'm doin' pretty weel."—"You're not so well to-day?"—"I don't think I am."—"How's the wife this morning?"—"Oh, she's very weel, I'm thinkin'."—"Will you take your hands away?"—"Yes, I'll do that." Intelligent though these answers seem, they were not so; for he was all the while suffering from a serious illness, he knew nothing about his wife, and, though he promised to keep his hands away, he did not do so.

Another patient named Ross, though chattering all day, had really no intelligent speech. Within a minute he would say such incoherent nonsense as, "If you would just come be! Oh, dear, dear! Oh! that is the whole clash. That's what! Oh, dear, dear me!" and so